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Naval Medical Research Unit-Dayton's Vertical Linear Accelerator

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The Vertical Linear Accelerator is designed to generate precisely controlled vertical accelerations and

At Wright Patterson Air Force Base in Ohio, the Naval Medical Research Unit (NAMRU) Dayton's aeromedical directorate conducts aerospace-relevant basic and applied research in the biomedical and behavioral sciences. Principal areas of investigation include spatial disorientation, situational awareness, motion sickness, adaptation to unusual acceleration environments, effects of altitude, sustained operations and fatigue, personnel selection testing, and visual and auditory sciences.

Our lab boasts a unique collection of man-rated acceleration research devices. These devices are used by NAMRU-Dayton researchers, as well as by visiting scientists from around the world. One of the devices is the Vertical Linear Accelerator (VLA).

The VLA is designed to generate precisely controlled vertical accelerations and serves as a platform for human research on such problems as vibration, spatial disorientation and motion sickness. Numerous studies have linked whole body vibration

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exposure, such as that experienced by helicopter occupants, to chronic neck and back pain, fatigue, discomfort, and even decreased situational awareness in the cockpit. Competing visual and vestibular sensory information on moving platforms can cause spatial disorientation or motion sickness. Mitigating vibration related neck and back pain, and understanding interactions between the visual and vestibular systems are critical for operational effectiveness.

The VLA possesses a stainless steel monolithic column, which allows 12 feet of vertical travel distance. For vibration research, low amplitude oscillations on the order of 0.1 G can be produced at frequencies between 4-25 Hz, a physiologically relevant range, and a range mirrored by the blade passing frequency of airframes currently in the DoD inventory. For vestibular research on applications such as motion sickness, sinusoidal accelerations of up to +/- 1 G can be produced at frequencies between 0.1 – 2 Hz. Air bearings between the column and carriage reduce velocity dependent noise and vibrations, minimizing external cuing to the volunteer subject. A fully reconfigurable carriage provides great flexibility allowing for the integrating of up to 400 pounds of payload which can include volunteer subjects, alternative seating design, visual displays, or other equipment.

For more information on NAMRU-Dayton visit our web site: http://www.med.navy.mil/sites/nmrc/Pages/namrud.htm

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